One per cent. 0 in the charge thus diminishes the heat demand for the production of 1 kilogramme steel by 350—336 = 14 calories . . . (62).

Practically, the production of steel in open-hearth furnaces from charges of the composition considered is not possible, even if they appeared feasible for the last considered case of the pure iron-carbon alloy. But here also the auxiliary action of large amounts of silica is necessary, as under normal circumstances it will be supplied by the furnace structure, and therewith gives rise ,to slag in an amount which ensures an advantageous course of the process.

Nevertheless should the charge contain silicon, manganese and phosphorus, without carbon, so these reducing agents employed individually or collectively are not able to allow the carrying out of the process. In the metal, there must always be so much carbon present that a boil and a reaction throughout of the bath takes place. In practical working there are, therefore, always several of the five substances, if not all, simultaneously present in the charge, and therefore one obtains from the figures ascertained explanation of the influence of the composition of the materials employed on the process.

Silica increases the heat demand (1 per cent. Si02 by 43 calories per kilogramme steel); silicon (15 calories) acts likewise unfavourably. On the other hand, phosphorus (11 calories), manganese (17 calories) and carbon (14 calories) diminish the heat requirement a little and thereby act favourably, nevertheless only so long as their amount does not exceed the extent which is prescribed through the oxidising action of the flame.